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April 14, 1960

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Dear Sir:

This letter report summarizes the research performed under Task Order No. RR during March, 1960. During this period, successful operation of the new reduced-size incinerator (Model 2) was demonstrated.

The Model 2 incinerator was assembled and experimental operation was begun on March 10. After four burning experiments in which average burning rates of from 67 to 114 pounds per hour were obtained, it was concluded that minor changes in the distribution of the air should be made to improve the over-all performance. These changes consisted of (1) increasing the proportion of secondary or overfire air by adding four more air nozzles, (2) decreasing the proportion of primary air and its degree of turbulence, and (3) enlarging the liner-louver gaps from 0.025 inch to 0.031 inch, to maintain the same proportion of cooling air at the reduced air velocities which would result from changes (1) and (2). The reduction in air velocities was also desirable from the standpoint of easing the space and power requirements of a blower-motor unit suitable for mounting within the shell of the incinerator just below the combustion chamber.

After the above modifications were made, five burning experiments were conducted to verify the performance of the unit using different kinds of paper. The following burning rates were obtained by intermittent batch feeding of a total of 200 pounds of each kind of paper:

- (1) Pages from telephone books - 85 pounds per hour

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- (2) Legal-size form tablets - 113 pounds per hour
- (3) File cards, 3 by 8 inches - 133 pounds per hour
- (4) Folded IBM sheets - 115 pounds per hour
- (5) Bags of assorted cards and papers - 138 pounds per hour.

The maximum amount of residue in the unit after the burning of each of these types of paper represented approximately 4 to 5 ounces of loose char and ash; the char was easily made illegible by manual crushing. The gas temperatures reached the normal 1800 F at times after loading of a batch; occasionally, the air flow was reduced in order to avoid overheating the grid. The usual light-grayish haze of fly ash was visible in the stack gases, and occasionally small pieces of illegible black char were emitted. The temperatures of the exposed surfaces at the top of the unit were lower than those for the Model 1 unit because of the new conical radiation shield which was incorporated in the design of the Model 2 unit.

On March 22, the Model 2 unit was demonstrated for you using an assortment of papers; an average burning rate of 110 pounds per hour was obtained. Discussions at this meeting also concerned the selection of a standard commercially available blower (and motor) which would have suitable air-flow characteristics and would fit the space initially provided in the blower-motor compartment. Sketches of the blower compartment, blower-motor unit, air-inlet route, and throttling damper were reviewed. You approved the design and layout on the basis that, with a probable extension of the Task Order No. RR contract, the effort could be pointed directly toward a Model 2 unit which would integrally house a blower-motor

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assembly. You requested that we submit a proposal to provide for further effort to incorporate an appropriate blower-motor assembly and controls, and to evaluate the performance of the integral unit.

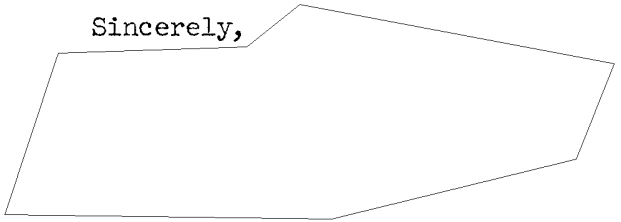
A suitable blower-motor assembly was subsequently ordered. This is the No. 22 Volume Fan (Buffalo Forge Company), with the rotor mounted directly on the horizontal shaft of a 3,500-rpm electric motor; the power required is 1-1/2 hp, based on 3-phase, 60-cycle, 220-volt alternating current.

During the remainder of the present phase of the research, some additional experiments for further evaluation of the unit will be made. These will consist of one continuous 8-hour burning experiment, and about four single-charge experiments. At your request, the continuous 8-hour evaluation will be performed during your next visit early in April. Also, an extension proposal, as described generally above, will be prepared and submitted.

The total appropriation on this Task Order was \$10,070. As of April 1, 1960, the unexpended balance was approximately \$880.

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Sincerely,



ABW/mlm

In Duplicate

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